Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_

**Honors Biology Final Study Guide**

*\* Note: Also review all previous tests and quizzes \**

**SCIENTIFIC METHOD**

* 1. What is an independent variable?
  2. What is a dependent variable?
  3. What is a control? What is the purpose of a control?
  4. What are constants? Why are they important?
  5. Be able to create a graph (make intervals, label, etc.)

**BIOCHEMISTRY**

Bohr model

Be able to draw one.

Bonding

Define and differentiate between covalent, ionic, and hydrogen bonds

Water

* + 1. Be able to draw and label a water molecule.
    2. What is polarity? What makes water polar?
    3. Why don’t nonpolar molecules dissolve in water?
    4. Explain what hydrogen bonds are and how they make water have high specific heat, cohesion, and adhesion

Macromolecules

Name the four macromolecules as well as their monomers and main functions.



Enzymes

What type of molecules are enzymes?

What environmental factors affect enzymes?

**ECOLOGY**

* + 1. What is the nitrogen cycle? Where does it occur within an ecosystem?
    2. What organisms are involved?
    3. Why do living organism need nitrogen?
    4. What human actions contribute to the nitrogen cycle?
    5. What is eutrophication?
    6. What are dead zones? Be able to describe in detail how dead zones are created.

**EVOLUTION**

**Vocabulary**

(biological) Evolution Natural Selection Variation

Gene Mutation Offspring

Heritable/Inherit Fitness Adaptation

**Charles Darwin**

1. Who was he? Where did he travel? On what vessel? What organisms did he study?
2. What is the name of the book he published?
3. What did he observe about finches that lead him to his theory?

**Natural Selection**

1. What is natural selection?
2. What does natural selection often lead to?
3. What is artificial selection?
4. What is more variation in a population usually better than less variation?
5. What is the relationship between mutations and variation?
6. True or false? Natural selection always leads to populations that are faster or bigger. EXPLAIN YOUR ANSWER!

**Evolution**

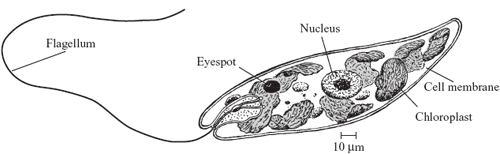
1. What is (biological) evolution?
2. How is biological evolution different from how evolution is often used to describe things in everyday language?
3. True or false? Individual evolve. EXPLAIN YOUR ANSWER!
4. True or false? Evolution is the same thing as natural selection? EXPLAIN YOUR ANSWER!
5. How do bacteria, like those that cause tuberculosis, become drug resistant? Why should someone always finish all their antibiotics?
6. Why is the frequency of the sickle cell anemia allele relatively high in sub-Saharan Africa (and the African American population)? What is the advantage of being a carrier for that allele?

**Evidence for evolution**

Be able to explain what these things are, how they prove evolution and give specific examples of each.

* + Fossils
  + Anatomy
    - Homologous structures
    - Vestigial structures
    - Analogous structures
  + Embryology
  + Biochemistry

**CELLS**

1. What is a cell?
2. What characteristics do ALL cells have?
3. What characteristics do prokaryotic cells have?
4. What types of organisms are prokaryotes?
5. What characteristics do eukaryotic cells have?
6. What types of organisms are eukaryotes?
7. What structures do plant cells have that animal cells don’t? Why do plants have these structures?
8. Are plants prokaryotes or eukaryotes?
9. Which evolved first: prokaryotes or eukaryotes?
10. What is the endosymbiotic theory? What organelles came about due to endosymbiosis? What is the evidence for the endosymbiotic theory?
11. Why type of cell is this? How do you know?

1. What structures would NOT help you identify the type of cell?
2. What is the function of the…
   * + 1. Nucleus?
       2. Ribosomes?
       3. Endoplasmic reticulum?
       4. Golgi apparatus?

**PHOTOSYNTHESIS and CELLULAR RESPIRATION**

1. What is the formula for photosynthesis?
2. What is the formula for cellular respiration?
3. How are photosynthesis and cellular respiration connected?
4. In what organelle does photosynthesis occur?
5. In what organelle does cellular respiration occur?
6. What types of organisms perform photosynthesis?
7. What types of organisms perform cellular respiration?
8. During what time of day would it be expected that oxygen levels are higher: daytime or nighttime? EXPLAIN WHY!
9. Be able to DRAW and LABEL a picture depicting how the products and reactants of photosynthesis and cellular respiration cycle in an ecosystem.
10. What occurs during the light-dependent reactions? Where do they occur?
11. What occurs during the Calvin cycle? Where does it occur?
12. What occurs during the glycolysis? Where does it occur?
13. What occurs during the Krebs cycle? Where does it occur?
14. What occurs during the electron transport chain? Where does it occur?
15. What is fermentation? Under what conditions does it occur?
16. What are the two types of fermentation and what do they create?

**TRANSPORT ACROSS CELL/PLASMA MEMBRANE**

1. What is the cell /plasma membrane made of?

1. Draw a picture of the phospholipid bilayer. Label the heads and tails. What part if hydrophobic? Hydrophilic?
2. Why is the cell membrane so important?
3. What is homeostasis?
4. What is…
5. Diffusion?
6. Osmosis?
7. Facilitated diffusion?
8. Active transport/pumps?
9. Endocytosis? (What role does this play in the immune system? What types of cells involved in the immune system do this?)
10. Exocytosis?
11. What are the differences between passive transport (diffusion, osmosis, and facilitated diffusion) and active transport (sodium/potassium pumps, endocytosis, and exocytosis)? What are the similarities?

**CELL DIVISON and REPRODUCTION**

**Vocabulary**

Interphase Mitosis Meiosis Cytokinesis

Sister chromatids Spindle fibers Homologous chromosomes

Gametes Fertilization Zygote

Embryo Ovulation

**Cell cycle**

1. What is the cell cycle?
2. Draw and label of picture of the cell cycle.
3. What is the name of the part of the cell cycle before cell division?
4. What are the three stages during the above describe part of the cell cycle? What occurs during these stages?

**Mitosis**

1. What are the two main purposes for mitosis (and cytokinesis)?
2. What would be the result if only mitosis was not followed by cytokinesis?
3. Organisms grow from single celled to multicellular through \_\_\_\_\_\_\_\_\_\_\_\_\_.
4. Know the order of each phase of mitosis and be able to explain what happens in each.
5. Prophase
6. How are cancer cells different from normal cells?
7. Why does someone undergoing chemotherapy often lose their hair?

**Meiosis**

1. What is the purpose of meiosis (and cytokinesis)?
2. What is the general name of the types of cells meiosis creates?
3. Are the cells created by meiosis haploid or diploid? What does that mean? Why is that important?
4. How is meiosis different from mitosis? (In the process itself? Types of cells created? Number of cell created?)
5. What is nondisjunction? What are disorders caused by nondisjunction?
6. What is crossing over/recombination? How does it increase variation?
7. Why are offspring of sexually reproducing organisms not exactly like their parents or their siblings?

**Fertilization**

1. What is fertilization?
2. What does fertilization create?

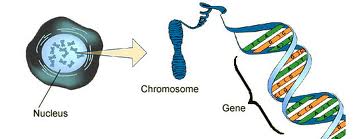
**Genetics**

**Vocabulary**

Alleles Genes Chromosome Trait

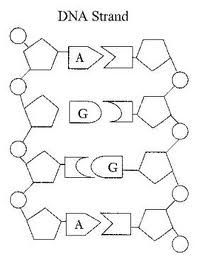
Homozygous HeterozygousGenotype Phenotype

**Overview**

* + 1. What is the relationship between genes, chromosomes, and DNA?
    2. What is the relationship between genes and traits?
    3. Explain how the parts in the picture are connected?

**DNA 🡪 RNA 🡪 protein**

1. What does DNA stand for? What is DNA’s function?
2. What is the structure of DNA?
3. What is a nucleotide and what are its three parts?
4. What are the four bases found in DNA? Which pairs with which?



1. Be able to identify the parts of a DNA molecule.
2. Describe the process of DNA replication.
3. What does RNA stand for?
4. What are the three types of RNA and functions of each?
5. What is the structure of RNA?
6. What are the four bases found in RNA? Which pairs with which?
7. How are DNA and RNA similar? Different?
8. Describe the process of transcription IN DETAIL. What molecules are needed? What molecules are made? In eukaryotes, where does it occur within the cell?
9. Describe the process of translation IN DETAIL. What molecules are needed? What molecules are made? Where does it occur within the cell?
10. Be able to identify pictures depicting replication, transcription, and translation.
11. How is DNA like a recipe?
12. Be able to transcribe and translate if given a DNA sequence.

Ex. ATC TCG

**Mutations**

1. What are mutations?
2. What is a(n)…

substitution?

insertion?

deletion?

1. If given two DNA sequences be able to determine what type of mutation occurred.
2. How can mutations affect protein production? How is this similar to a change in a recipe?
3. How is it possible that a mutation not affect protein production?

**Gregor Mendel**

1. Who is he? What did he study?

**Punnett Squares**

1. What is the purpose of Punnett squares?
2. If given information be able to identify the parental genotypes.
3. Be able to correctly set-up and complete a Punnett square.
4. Be able to give the genotypes and phenotypes of potential offspring as well as the probability of each.

**Patterns of inheritance**

1. How is a dominant allele different from a recessive allele?
2. What does it mean to be a “carrier”?
3. Explain how two parents with dominant traits (ex. purple color) can have offspring with recessive traits (ex. white color.)
4. How is incomplete dominance different from complete dominance?
5. How is co-dominance different from complete dominance?
6. What is X-linked inheritance?
7. Why do recessive X-linked disorders affect males more than females? Give examples of these types of disorders?

**Body systems**

* + Be able to identify the following organs on an actual fetal pig or on a picture of pig or human anatomy:
    - heart, lungs, liver, gall bladder, stomach, spleen, pancreas, small intestine, large intestine, kidneys